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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/931,506	08/16/2001	Shannon Mitchell	2002906-0002	3684

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EXAMINER

SULLIVAN, DANIEL M

ART UNIT	PAPER NUMBER
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1636

DATE MAILED: 12/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/931,506

Applicant(s)

MITCHELL ET AL.

Examiner

Daniel M Sullivan

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 148, 185, 188-190, 194 and 196-198 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 148, 185, 188-190, 194, and 196-198 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

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### **DETAILED ACTION**

This Non-Final Office action is a reply to the "RESPONSE TO OFFICE ACTION UNDER 37 C.F.R. §1.111" of 2 October 2003 (hereinafter, 2 October Paper) filed in response to the Non-Final Office Action mailed 31 March 2003 (hereinafter, 31 March Office Action). Claims 1-131, 168-181 and 205-218 were withdrawn from consideration and claims 132-167 and 182-204 were considered in the 31 March Office Action. Claims 1 -147, 149-184, 186, 187, 191-195, and 199-218 were canceled and claims 148, 185, 188-190, 194, and 196-198 were amended in the 2 October Paper. Claims 148, 185, 188-190, 194, and 196-198 are presently pending and under consideration.

#### ***Response to Amendment***

Rejection of claims 132-147, 149-167, 182-184, 186, 187, 192, 193, 195, 199-201, 203 and 204 is rendered moot by cancellation of the claims.

Objection to claims 148, 185, 188-190, 194 and 196-198 is withdrawn.

#### ***Claim Rejections - 35 USC § 102***

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 148 is rejected under 35 U.S.C. 102(b) as being anticipated by Bruchman *et al.* (1995) WO 95/29712 (hereinafter Bruchman '712).

Although the claim was previously indicated to be free of the art, upon further consideration, it is clear that the limitations of the claim are anticipated by Bruchman *et al.* The

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claim is directed to a tissue engineered construct that has been subject to decellularization, wherein the construct has been subjected to electrical stimulation during a first growth period.

As described in the previous Office Action, Bruchman '712 teaches a tissue engineered construct comprising a substrate seeded with cells and maintained under conditions suitable for growth of the cells for a growth period which is subsequently subjected to decellularization. Although, Bruchman '712 does not teach electrical stimulation, the electrical stimulation of the claim is a process limitation which must result in a product having properties that are different from those of the prior art to be patentable. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) states: "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process."

In the instant case, the electrical stimulation is not limited to any particular amount or duration of stimulation. Therefore, it is more likely than not that the claim encompasses embodiments that are no different from the constructs made with no electrical stimulation at all. Therefore, the construct of Bruchman '712 is the same as the instant claimed construct.

Claims 148, 185, 189, 190, 194, 196 and 197 are rejected under 35 U.S.C. 102(b) as being anticipated by either one of Bruchman *et al.* (1997) WO 97/46266 (hereinafter, Bruchman '266) or Bruchman *et al.* (March 1999) U.S. Patent No. 5,879,383 (hereinafter, Bruchman '383).

Although the claims were previously indicated to be free of the art, upon further consideration, it is clear that the limitations of the claims are anticipated by Bruchman '266 and Bruchman '383.

The limitations of claim 148 are recited herein above. Claims 185, 189, 190, 194, 196 and 197 are each directed to a construct comprising a decellularized tissue engineered construct and a population of cells. As described in the previous Office Action, Bruchman '266 and Bruchman '383 each teach a tissue engineered construct that has been subjected to decellularization and wherein the decellularized construct is reseeded with a population of cells. As discussed herein above, the limitation that the construct be subjected to electrical stimulation during a first growth period, as set forth in claims 148 and 185, does not distinguish the claimed subject matter from the art because the process step does not result in a patentably distinct product.

Likewise, there is no evidence of record that the construct produced using neonatal cells (claim 189) or *in vitro* cultured cells (claim 194), which would encompass neonatal or cultured vascular smooth muscle and endothelial cells, would be different from the construct produced according to the teachings of Bruchman '266 and Bruchman '383. Further, the limitation that the construct be produced with genetically transformed cells, recited in claim 190, does not distinguish the claimed product because many genetically transformed cells would produce a construct that is the same as the construct described by Bruchman '266 and Bruchman '383. For example, a tissue engineered construct produced using a vascular smooth muscle cell transformed to express a protein that is not secreted and is not involved in synthesis of extracellular matrix proteins would not be different from tissue engineered construct produced

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using an untransformed cell. Therefore, claim 190 still reads on the decellularized tissue engineered construct of Bruchman '266 and Bruchman '383.

With regard to claims 196 and 197, directed to constructs that have been seeded with a population of cells comprising two different cell types (claim 196) or comprising neonatal cells (claim 197), again the claims broadly read on the constructs disclosed in Bruchman '266 and Bruchman '383. The instant claim 196 does not set forth any particular limitations on the proportions of two cell types comprised in the population. Therefore, even minor populations of contaminating cells (e.g., fibroblasts, endothelial cells, blood cells) which one of ordinary skill would expect to find in the primary endothelial cells used to seed the decellularized tissue engineered constructs of Bruchman '266 and Bruchman '383, would meet the limitations of the second cell population. With regard to claim 197, there is no evidence of record that a construct seeded with neonatal endothelial cells would differ from the constructs of Bruchman '266 and Bruchman '383, seeded with adult vascular endothelial cells in any way. Therefore, the construct of the instant claim 197 is also anticipated by the teachings of Bruchman '266 and Bruchman '383.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 188 and 198 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruchman '266 and Bruchman '383.

The claims are directed to a construct comprising a decellularized tissue engineered construct and a population of cells, wherein the decellularized tissue engineered construct is produced using human cells (claim 188) or seeded with human cells (claim 189). As described above, Bruchman '266 and Bruchman '383 teach a decellularized tissue engineered construct that is further repopulated with vascular endothelial cells. Although Bruchman '266 and Bruchman '383 do not explicitly teach that the constructs should be made using human cells, the limitation would be obvious to one of ordinary skill in the art at the time the invention was made.

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Both Bruchman '266 and Bruchman '383 teach that the decellularized tissue engineered constructs described therein are to be used as vascular prostheses to be used in humans (see, e.g., the Abstracts). Further, one of ordinary skill in the art would know that it is desirable to use homotypic cells and tissues in the manufacture of the decellularized tissue engineered constructs in order to avoid the immune response that is typically elicited by xenotypic cells and tissues. Thus, the ordinary skilled artisan would have both the knowledge and motivation to use human cells in the manufacture of the constructs of Bruchman '266 and Bruchman '383. Therefore, the invention of claims 188 and 198, as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel M Sullivan whose telephone number is 703-305-4448. The examiner can normally be reached on Monday through Friday 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Remy Yucel, Ph.D. can be reached on 703-305-1998. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0196.

Please note: Art Unit 1636 will be moving to the new USPTO facilities on 14 January 2004. After that date, Examiner Sullivan can be reached at 571-272-0779 and Examiner Yucel can be reached at 571-272-0781.

*Anne-Marie Falk*  
ANNE-MARIE FALK, PH.D.  
PRIMARY EXAMINER



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